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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/587,094

**Applicant(s)**

LI ET AL.

**Examiner**

PETER COUGHLAN

**Art Unit**

2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 and 9-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

### Detailed Action

1. This office action is in response to an AMENDMENT entered June 2, 2009 for the patent application 10/587094 filed on July 20, 2006.
2. The First Office Action of December 17, 2008 is fully incorporated into this Final Office Action by reference.
3. Examiner's Comments:

The Examiner found no art pertaining to dependent claim 6 or 22. If the elements of these claim(s) were integrated into the independent claim, this would more prosecution of the application forward.

Although, the terms 'carrier wave' or 'carrier signal' is not specifically mentioned within the specification, the Examiner will exclude these interpretations wherein the context of 'mediums' is disclosed.

Independent claim 9 and associated dependent claim recite an 'apparatus.' The Examiner points out to the applicant that 'apparatus' is not defined within the specification. It is only mentioned in the abstract. If prosecution is to move forward, 'apparatus' must be defined with the risk of introducing new matter or these claims are to be withdrawn.

***Status of Claims***

4. Claims 1-7, 9-23 are pending.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7, 9-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant changed 'utilizing' to 'based upon' in an effort to over come the rejection. This does not explain what exactly is happening with claim limitations and the applicant arguments support this position. The applicant states 'Basically, there may be several ways of eliminating the at least one feature from the group based upon the value for each feature in the group, as stated in paragraph 0028 of the present application. For example, based upon different applications, a feature with minimum value or a feature with maximum value may be eliminated. Considering the different ways of feature elimination.' The applicant admits there nothing clear about this portion of the claim because there can be 'several ways of eliminating the at least one feature.' The applicant seeks a patent without a clear description of how the method, apparatus, or software being executed works.

These claims must be amended or withdrawn from consideration.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7, 9-21, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cristianini in view of Guyon. ('Support vector machines and other kernel based learning methods', referred to as **Cristianini**; 'Gene selection for cancer classification using support vector machines', referred to as **Guyon**)

**Claim 1**

Cristianini teaches determining a value for each feature in a group of features provided by a training data (**Cristianini**, p30; 'Training data' of applicant is equivalent to 'training points' of Cristianini. 'Determining the value for each feature' of applicant is accomplished by the 'decision rule' of Cristianini.); eliminating at least one feature from the group based upon the value for each feature in the group (**Cristianini**, p29; 'Eliminating at least one feature' of applicant is disclosed by 'detection of irrelevant features and their subsequent elimination' of Cristianini.); updating the value for each

feature in the group based on a part of the training data that corresponds to the eliminated feature. (Cristianini, p29; 'Updating the value for each function' of applicant is the result of 'dimensionality reduction' of Cristianini.)

Cristianini does not teach repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list; and recognizing a new data corresponding to the group of features with the feature ranking list.

Guyon teaches repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list (Guyon, Summary, p9; 'Repeating' of applicant maps to 'recursion' of Guyon. 'Elimination the at least one feature' of applicant maps to 'recursive feature elimination (RFE)' of Guyon. 'Updating the value for each feature' of applicant maps to ' $c_i = (w_i)^2$ , for all  $i$ ' of Guyon. 'Until a number of features in the group reaches a predetermined value' of applicant maps to 'repeat until  $s = [ ]$ ' of Guyon.); and recognizing a new data corresponding to the group of features with the feature ranking list. (Guyon, p9; Recognizing a new data with the feature ranking list of applicant maps to 'output: feature ranked list  $r$ ' of Guyon.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Cristianini by using repeating techniques for eliminating duplicate features as taught by Guyon to have repeating of eliminating the at least one feature from the group and updating the value for each feature of the

group until a number of features in the group reaches a predetermined value to generate a feature ranking list; and recognizing a new data corresponding to the group of features with the feature ranking list.

For the purpose of producing an accurate listing with a lower computational cost.

Claim 2

Cristianini teaches a plurality of training samples, each of the training samples corresponding to the group of features. (**Cristianini**, p30; 'Training samples' of applicant is equivalent to 'training points' of Cristianini. It is inherent that training points of Cristianini relates to at least one group.)

Claim 3

Cristianini teaches computing a kernel data based on the training data (**Cristianini**, p30; 'Computing the kernel data' of applicant is equivalent to transforming the data into a feature space' of Cristianini.); computing the value for each feature of the group based on the kernel data (**Cristianini**, p30; 'Computing the value' of applicant is accomplished by the 'kernel function' of Cristianini. Cristianini discloses that the kernel function uses training points and the test points.); and storing the kernel data in a buffer. (**Cristianini**, p125; 'Buffer' of applicant is equivalent to 'memory space' of Cristianini.)

Claim 4

Cristianini teaches computing a matrix as the kernel data, each component of the matrix comprising a dot product of two of training samples provided by the training data. (**Cristianini**, p168; 'Dot product' of applicant is equivalent to 'dot product' of Cristianini.)

Claim 5

Cristianini teaches retrieving a kernel data from a buffer (**Cristianini**, p125; 'Buffer' of applicant is equivalent to 'memory space' of Cristianini.); updating the kernel data based on the part of the training data that corresponds to the eliminated features (**Cristianini**, p29; 'Updating the kernel data' of applicant is the result of 'dimensionality reduction' of Cristianini.); and updating the value for each feature of the group based on the updated kernel data. (**Cristianini**, p29; 'Updating the value for each function' of applicant is the result of 'dimensionality reduction' of Cristianini.)

Claim 7

Cristianini teaches computing a ranking criterion for each feature of the group based on the value for the each feature (**Cristianini**, p18; 'Ranking criterion' of applicant is achieved by using the perceptron algorithm which can be used to rank the data according to their information content of Cristianini.); eliminating the at least one feature with the minimum ranking criterion from the group (**Cristianini**, p29; 'Eliminating at least one feature' of applicant is disclosed by 'detection of irrelevant features and their subsequent elimination' of Cristianini.); and recording the eliminated feature in a feature ranking list. (**Cristianini**, 'Recording the eliminated feature in a feature ranking



list' of applicant is inherent in Cristianini, due to if Cristianini can determine which of the features is irrelevant, then it must be 'recorded' in some memory for comparison purposes.)

#### Claim 9

Cristianini teaches a training logic to determine a value for each feature in a group of features provided by a training data (**Cristianini**, p30; 'Training data' of applicant is equivalent to 'training points' of Cristianini. 'Determine a value for each feature' of applicant is accomplished by the 'decision rule' of Cristianini.); and an eliminate logic to eliminate at least one feature from the group based upon the Value for each feature in the group (**Cristianini**, p29; 'Eliminating at least one feature' of applicant is disclosed by 'detection of irrelevant features and their subsequent elimination' of Cristianini.); wherein the training logic further updates the value for each feature in the group based on a part of the training data that corresponds to the eliminated feature. (**Cristianini**, p29; 'Updating the value for each feature' of applicant is the result of 'dimensionality reduction' of Cristianini.)

Cristianini does not teach and the apparatus further repeats eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value, to generate a feature ranking list for a use of recognizing a new data corresponding to the group of features.

Guyon teaches and the apparatus further repeats eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value, to generate a feature ranking list for a use of recognizing a new data corresponding to the group of features. (Guyon, Summary, p9; 'Repeating' of applicant maps to 'recursion' of Guyon. 'Elimination the at least one feature' of applicant maps to 'recursive feature elimination (RFE)' of Guyon. 'Updating the value for each feature' of applicant maps to ' $c_i = (w_i)^2$ ', for all  $i$ ' of Guyon. 'Until a number of features in the group reaches a predetermined value' of applicant maps to 'repeat until  $s = [ ]$ ' of Guyon. Recognizing a new data with the feature ranking list of applicant maps to 'output: feature ranked list  $r$ ' of Guyon.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Cristianini by using repeating techniques for eliminating duplicate features as taught by Guyon to have the apparatus further repeats eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value, to generate a feature ranking list for a use of recognizing a new data corresponding to the group of features.

For the purpose of producing an accurate listing with a lower computational cost.

#### Claim 10

Cristianini teaches wherein the training data comprises a plurality of training samples, each of the training samples having the group of features. (Cristianini, p30;

'Training samples' of applicant is equivalent to 'training points' of Cristianini. It is inherent that training points of Cristianini relates to at least one group.)

Claim 11

Cristianini teaches a decision logic to decide whether to repeat the elimination of the at least one features from the group and update of the value for each feature of the group until a number of features in the group reaches a predetermined value.

(Cristianini, p45; 'Repeating' of applicant is disclosed as 'recursion' of Cristianini. 'Until a number of features in the group reaches a predetermined value' of applicant is disclosed by using recursion 'until the full length of n characters has been attained' of Cristianini.)

Claim 12

Cristianini teaches wherein the training logic further comprises: a kernel data logic to compute a kernel data based upon the training data (Cristianini, p30; 'Computing the kernel data' of applicant is equivalent to transforming the data into a feature space' of Cristianini.); a buffer to store a kernel data (Cristianini, p125; 'Buffer' of applicant is equivalent to 'memory space' of Cristianini.); a value logic to compute the value based on the kernel data. (Cristianini, p30; 'Computing the value' of applicant is accomplished by the 'kernel function' of Cristianini. Cristianini discloses that the kernel function uses training points and the test points.)

Claim 13

Cristianini teaches wherein the kernel data logic further updates the kernel data in the buffer based on the part of the training data that corresponds to the eliminated features (**Cristianini**, p29; 'Updating the kernel data' of applicant is the result of 'dimensionality reduction' of Cristianini.), and the value logic further updates the value based upon the updated kernel data. (**Cristianini**, p29; 'Updating the value' of applicant is the result of 'dimensionality reduction' of Cristianini.)

Claim 14

Cristianini teaches wherein the kernel data logic further subtracts a matrix from the kernel data, each component of the matrix comprising a dot product of two of training samples provided by the part of the training data. (**Cristianini**, p168; 'Dot product' of applicant is equivalent to 'dot product' of Cristianini.)

Claim 15

Cristianini teaches wherein the eliminate logic further comprises a ranking criterion logic to compute a ranking criterion for each feature of the group based on the value for the each feature. (**Cristianini**, p18; 'Ranking criterion' of applicant is achieved by using the perceptron algorithm which can be used to rank the data according to their information content of Cristianini.)

Claim 16

Cristianini teaches wherein the eliminate logic further comprises a feature eliminate logic to eliminate the at least one feature having the minimum ranking criterion from the group. (**Cristianini**, p29; 'Feature eliminate logic' of applicant is disclosed by 'detection of irrelevant features and their subsequent elimination' of Cristianini.);

#### Claim 17

Cristianini teaches determining a value for each feature in a group of features provided by a training data (**Cristianini**, p30; 'Training data' of applicant is equivalent to 'training points' of Cristianini. 'Determine a value for each feature' of applicant is accomplished by the 'decision rule' of Cristianini.); eliminating at least one feature from the group based upon the value for each feature in the group (**Cristianini**, p29; 'Eliminating at least one feature' of applicant is disclosed by 'detection of irrelevant features and their subsequent elimination' of Cristianini.); updating the value for each feature in the group based on a part of the training data that corresponds to the eliminated feature. (**Cristianini**, p29; 'Updating the value for each feature' of applicant is the result of 'dimensionality reduction' of Cristianini.)

Cristianini does not teach repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list: and recognizing a new corresponding to the group of features with the feature ranking list.

Guyon teaches repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list (**Guyon**, Summary, p9; 'Repeating' of applicant maps to 'recursion' of Guyon. 'Elimination the at least one feature' of applicant maps to 'recursive feature elimination (RFE)' of Guyon. 'Updating the value for each feature' of applicant maps to ' $c_i = (w_i)^2$ ', for all  $i$ ' of Guyon. 'Until a number of features in the group reaches a predetermined value' of applicant maps to 'repeat until  $s = [ ]$ ' of Guyon.); and recognizing a new corresponding to the group of features with the feature ranking list. (**Guyon**, p9; Recognizing a new data with the feature ranking list of applicant maps to 'output: feature ranked list  $r$ ' of Guyon.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Cristianini by using repeating techniques for eliminating duplicate features as taught by Guyon to have repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list: and recognizing a new corresponding to the group of features with the feature ranking list.

For the purpose of producing an accurate listing with a lower computational cost.

#### Claim 18

Cristianini teaches wherein the training data further comprises a plurality of training samples, each of the training samples corresponding to the group of features.

(**Cristianini**, p30; 'Training samples' of applicant is equivalent to 'training points' of Cristianini. It is inherent that training points of Cristianini relates to at least one group.)

Claim 19

Cristianini teaches computing a kernel data based on the training data (**Cristianini**, p30; 'Computing the kernel data' of applicant is equivalent to transforming the data into a feature space' of Cristianini.); computing the value for each feature of the group based on the kernel data (**Cristianini**, p30; 'Computing the value' of applicant is accomplished by the 'kernel function' of Cristianini. Cristianini discloses that the kernel function uses training points and the test points.); and storing the kernel data in a buffer. (**Cristianini**, p125; 'Buffer' of applicant is equivalent to 'memory space' of Cristianini.)

Claim 20

Cristianini teaches wherein the plurality of instructions that result in the computing system computing the kernel data, further result in the computing system computing a matrix as the kernel data, each component of the matrix comprising a dot product of two of training samples provided by the training data. (**Cristianini**, p168; 'Dot product' of applicant is equivalent to 'dot product' of Cristianini.)

Claim 21

Cristianini teaches retrieving a kernel data from a buffer (**Cristianini**, p125; 'Buffer' of applicant is equivalent to 'memory space' of Cristianini.); updating the kernel

data based on the part of the training data that corresponds to the eliminated feature (**Cristianini**, p29; 'Updating the kernel data' of applicant is the result of 'dimensionality reduction' of Cristianini.); and updating the value for each feature of the group based on the updated kernel data. (**Cristianini**, p29; 'Updating the value for each feature' of applicant is the result of 'dimensionality reduction' of Cristianini.)

#### Claim 23

Cristianini teaches computing a ranking criterion for each feature of the group based on the value for the each feature (**Cristianini**, p18; 'Ranking criterion' of applicant is achieved by using the perceptron algorithm which can be used to rank the data according to their information content of Cristianini.); eliminating the at least feature with the minimum ranking criterion from the group (**Cristianini**, p29; 'Eliminating at least one feature' of applicant is disclosed by 'detection of irrelevant features and their subsequent elimination' of Cristianini.); and recording the eliminated feature in a feature ranking list. (**Cristianini**, 'Recording the eliminated feature in a feature ranking list' of applicant is inherent in Cristianini, due to if Cristianini can determine which of the features is irrelevant, then it must be 'recorded' in some memory for comparison purposes.)



6. Applicant's arguments filed on June 2, 2009 for claims 1-7, 9-23 have been fully considered but are not persuasive.

7. In reference to the Applicant's argument:

Remarks

Claims 1,9 and 17 have been amended, claims 8 and 24 have been canceled. Reconsideration and allowance of the pending claims are respectfully requested.

Specification objection

The Office Action objected to non-statutory subjects in paragraph 0009 (the paragraph number in the Office Action seems to be incorrect). Applicant has amended the specification by canceling the related subjects from paragraph 0009. Withdrawal of the present objection is respectfully requested.

Examiner's response:

The Examiner notes the amended specification and withdraws the objection.

8. In reference to the Applicant's argument:

Claims Rejections Under 35 U.S.C. 101

The Office Action rejected claims 1-24 under 35 U.S.C. 101 for nonstatutory subject matter. Applicant has amended independent claims 1,9 and 17 to be limited to a substantial practical application. In other words, the algorithm of claims 1,9 and 17 would generate a featuring ranking list which would be used for data recognition in the future. Paragraph 0017 states an example of the practical application. More specifically, the feature ranking list can help to detect if a person has a disease or not by checking his/her gene expression with the gene feature ranking list generated by the algorithm. The algorithm of claims 1,9 and 17 can be used in other applications of data recognition. For example, it can be used for face recognition with face feature ranking list generated by the algorithm.

In light of the above, Applicant respectfully submits that final result of the data

recognition with the feature ranking list generated by the algorithm, e.g., disease detection and face recognition, meets the requirement of being "useful, tangible and concrete" set forth by the Office Action. Reconsideration and withdrawal of the present rejection are respectfully requested.

If Examiner disagrees with the above, Applicant respectfully requests Examiner to suggest a claim amendment complying with U.S.C. 101.

Examiner's response:

In light of the applicant arguments, the rejection is removed. The method claims (1-7) are assumed to be computer implemented. The practical application is recited in ¶0017, to 'determine whether a person has a disease by checking his/her gene expression with a gene ranking list output.'

9. In reference to the Applicant's argument:

Claims Rejections Under 35 U.S.C. 112

The Office Action rejected claims 1-24 under 35 U.S.C. 112 for the unclearness of the term "utilizing". Applicant has changed the term into "based upon". Basically, there may be several ways of eliminating the at least one feature from the group based upon the value for each feature in the group, as stated in paragraph 0028 of the present application. For example, based upon different applications, a feature with minimum value or a feature with maximum value may be eliminated. Considering the different ways of feature elimination, Applicant respectfully submits that the claims as amended particularly and distinctly claim the subject matter. Reconsideration and withdrawal of the present rejection are respectfully requested.

Examiner's response:

The rejection stands. See section 5 above.

10. In reference to the Applicant's argument:

Claims Rejections Under 35 U.S.C. 102

The Official Action rejected claims 1-5, 7-21, 23 and 24 under 35 USC 102(b) as being anticipated by Cristianini. Applicant respectfully requests reconsideration and withdrawal of the present rejection.

As is well-established, in order to successfully assert a prima facie case of anticipation, the Office Action must provide a single prior art document that includes every element and limitation of the claim or claims being rejected. Therefore, if even one element or limitation is missing from the cited document, the Office Action has not succeeded in making a prima facie case.

Claims 1-7 and 17-23 rejections

Each of claims 1 and 17 recites a method comprising: .....eliminating at least one feature from the group based upon the value for each feature in the group; updating the value for each feature in the group based on a part of the training data that corresponds to the eliminated feature; repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list ..... is unanticipated by Cristianini.

Cristianini teaches support vector machines (SVM) and other kernel-based learning methods, in which the portion cited in the Office Action (i.e., Chapter 3) is related to a method of projecting data into a high dimensional feature space by use of kernel representations. According to Chapter 3, the representation of an input data is changed by mapping the input space of the data into a feature space (section 3.1 ); kernel is computed based upon the new representation of the data (sections 3.2 and 3.3); and the data may be classified by using a decision rule on the data mapped in the feature space, in which the decision rule is evaluated with the kernel computed as the above (section 3.2). As stated in Page 29 of Cristianini, during the process of changing the data representation, in order to select suitable representation, a feature selection is performed. More specifically, features corresponding to directions in which the data have low variance are eliminated.

Applicant respectfully submits that Cristianini teaches away from the invention of claims 1 or 17 because of the following reasons:

Firstly, The Office Action appears to regard the value obtained from evaluating the decision rule as the value of claims 1 and 17. However, page 29 of Cristianini teaches the features are eliminated based upon the data variance, rather than the value obtained from evaluating the decision rule. Further, from Chapter 3, feature elimination happens before the kernel computation and the decision rule evaluation. Therefore, Applicant can not figure out how the features of Cristianini are eliminated based upon

the value generated after the feature elimination. In view of this, Cristianini does not teach eliminating at least one feature from the group based upon the value for each feature in the group, as requested by claims 1 and 17.

Secondly, Cristianini teaches kernel computation in sections 3.2 and 3.3. However, Cristianini does not mention anything about updating the kernel and the result of decision rule evaluation, no to say updating them based upon a part of the training data that corresponds to the eliminated features. Here, Applicant respectfully submits that computing the value is different from updating the value, wherein the latter should be performed after and based upon the former. Reasons for that may comprise that Cristianini is related to a SVM method, but not to a SVM-RFE method, i.e., recursive feature eliminating based on a SVM method. In other words, the SVM method of Cristianini performs feature elimination, kernel computation, and decision rule evaluation only once so that the input data can be classified. However, it does not update the kernel and the decision rule evaluation and repeat the updating, in order for recursive feature elimination.

Thirdly, the Office Action appears to rely on page 45 of Cristianini for the teaching of repeating eliminating the at least one feature and updating the value. Applicant respectfully submits that page 45 teaches a method of computing the kernel, wherein the kernel  $K_n$  is computed based upon a recursive computation of function  $K_i'$ , wherein  $i = 1, \dots, n$ . Function  $K_i'$  is generated in order to compute the kernel, but function  $K_i'$  itself is different from the Kernel  $K$ , based upon the definitions of the Kernel  $K$  and the function  $K_i'$  in section 3.3, example 3.3.3. In other words, function  $K_i'$  is not a kernel as defined. In view of this, the kernel  $K$  is computed once, and therefore there is no concept of repeating updating the kernel. "Recursive" as page 45 does not mean "repeating" a same process (e.g., repeat updating the kernel), but mean "returning" to a former element (e.g., return to function  $K_i'$ ).

Further, Applicant respectfully submits that Cristianini does not teach repeating the feature eliminating. Section 3.3 teaches kernel computation, but not mention anything about feature eliminating. According to Cristianini, the feature eliminating is performed once before Kernel computation (see section 3.1).

Since Cristianini provides no teaching in regard to eliminating at least one feature from the group based upon the value for each feature in the group; updating the value for each feature in the group based on a part of the training data that corresponds to the eliminated feature; repeating of eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list ..... Cristianini does not anticipate claim 1 and 17.

Claims 2-7 and 18-23 depending on claim 1 or 17 are at least allowable for the reasons noted above.

Claims 9-16 rejections

For similar reasons proffered to claims 1 and 17, claim 9 of the current invention defines an eliminate logic to eliminate at least one feature from the group based upon the value for each feature in the group, wherein the training logic further updates the value for each feature in the group based on a part of the training data that corresponds to the eliminated feature, and the apparatus further repeats eliminating the at least one feature from the group and updating the value for each feature of the group until a number of features in the group reaches a predetermined value to generate a feature ranking list for a use of recognizing a new data corresponding to the group of features, is unanticipated by Cristianini.

Each of claims 10-16 include claim 9 as a base claim and are therefore allowable for at least similar reasons. Applicant respectfully requests the present rejection of claims 9-16 be withdrawn.

Examiner's response:

Guyon addresses the amended claims. 'Repeating' of applicant maps to 'recursion' of Guyon. 'Elimination the at least one feature' of applicant maps to 'recursive feature elimination (RFE)' of Guyon. 'Updating the value for each feature' of applicant maps to ' $c_i = (w_i)^2$ , for all i' of Guyon. 'Until a number of features in the group reaches a predetermined value' of applicant maps to 'repeat until  $s = [ ]$ ' of Guyon. Recognizing a new data with the feature ranking list of applicant maps to 'output: feature ranked list r' of Guyon. (**Guyon**, Summary, p9)

Although repeating is of a different format than recursion, they have the same effect result. There is no difference result from a function, procedure, or subroutine being placed within a loop than a function, procedure or subroutine calling itself.

11. In reference to the Applicant's argument:

Further, Applicant noticed that the Office Action does not mention claims 6 and 21 in U.S.C. 102 rejection opinions. Does Examiner think they are allowable if rewriting them to depend on claim 1 or 17?

Examiner's response:

This is addressed within the Examiner's comments section. In light of the reference 'Guyon' and associated documents, the applicant needs to review what the invention contains that these documents does not contain.

### ***Examination Considerations***

12. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

13. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

14. Examiner's Opinion: Paragraphs 12 and 13 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Claims 1-7, 9-23 are rejected.

***Correspondence Information***

17. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3080. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,



Customer Service Window,  
Randolph Building,  
401 Dulany Street,  
Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

(571) 272-3150 (for formal communications intended for entry.)

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/P. C./

Examiner, Art Unit 2129

Peter Coughlan

7/29/2009

/David R Vincent/

Supervisory Patent Examiner, Art Unit 2129

